GEOLOGY FIELD TRIP

OHIO ACADEMY OF SCIENCE

April 17, 1954

SOME GEOLOGIC FEATURES OF ATHENS COUNTY

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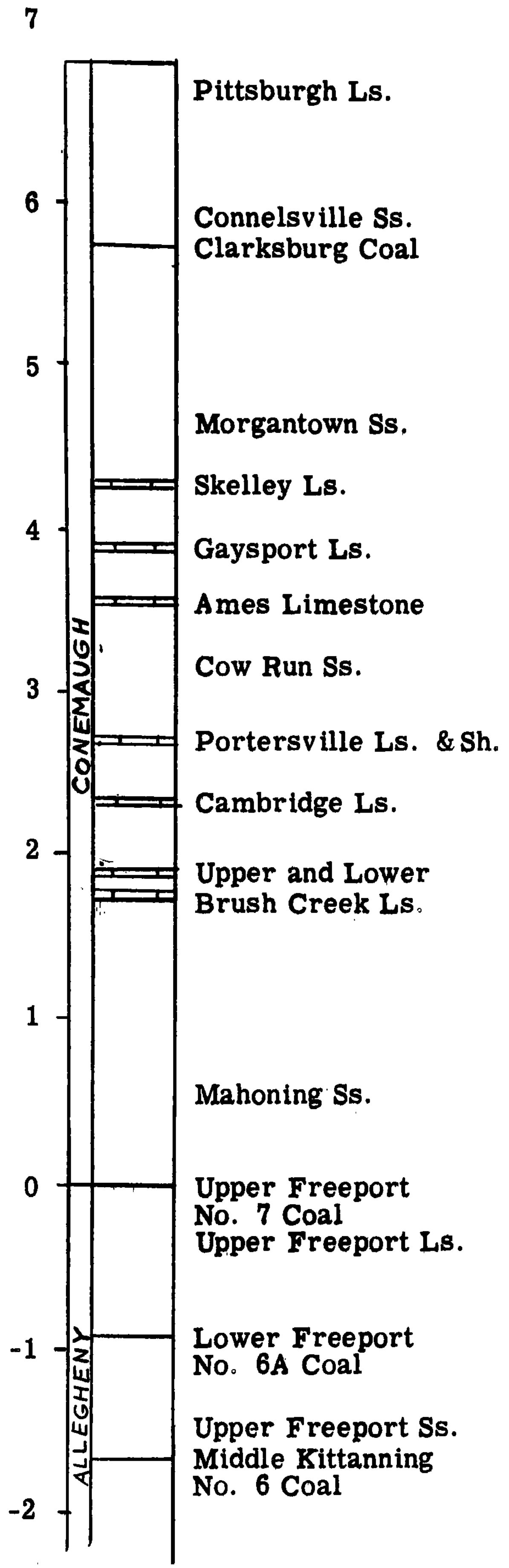
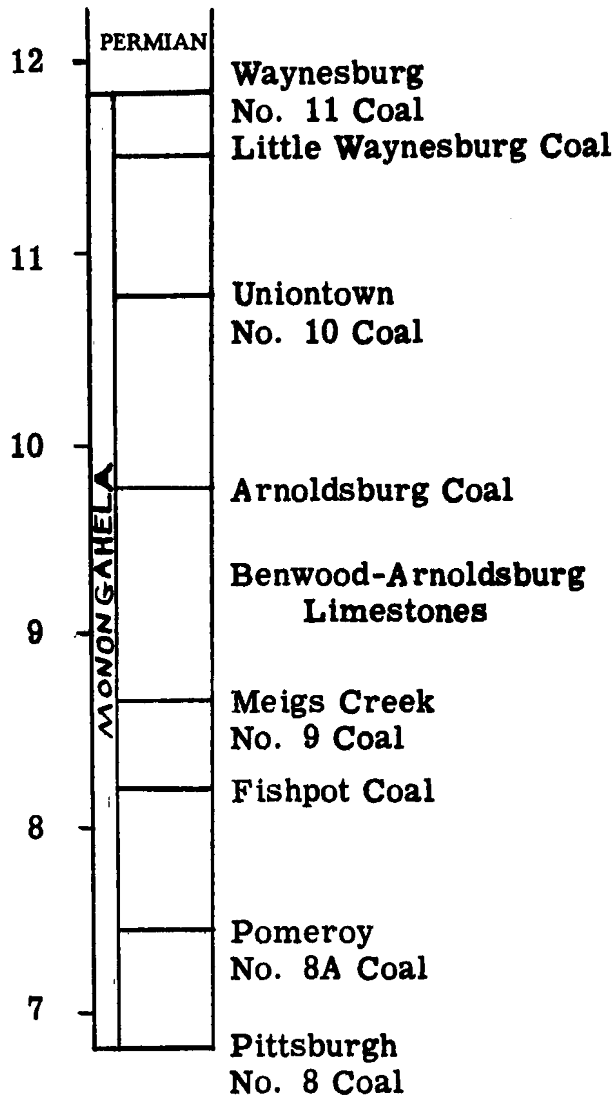
OHIO UNIVERSITY
ATHENS, OHIO

1804 - 1954



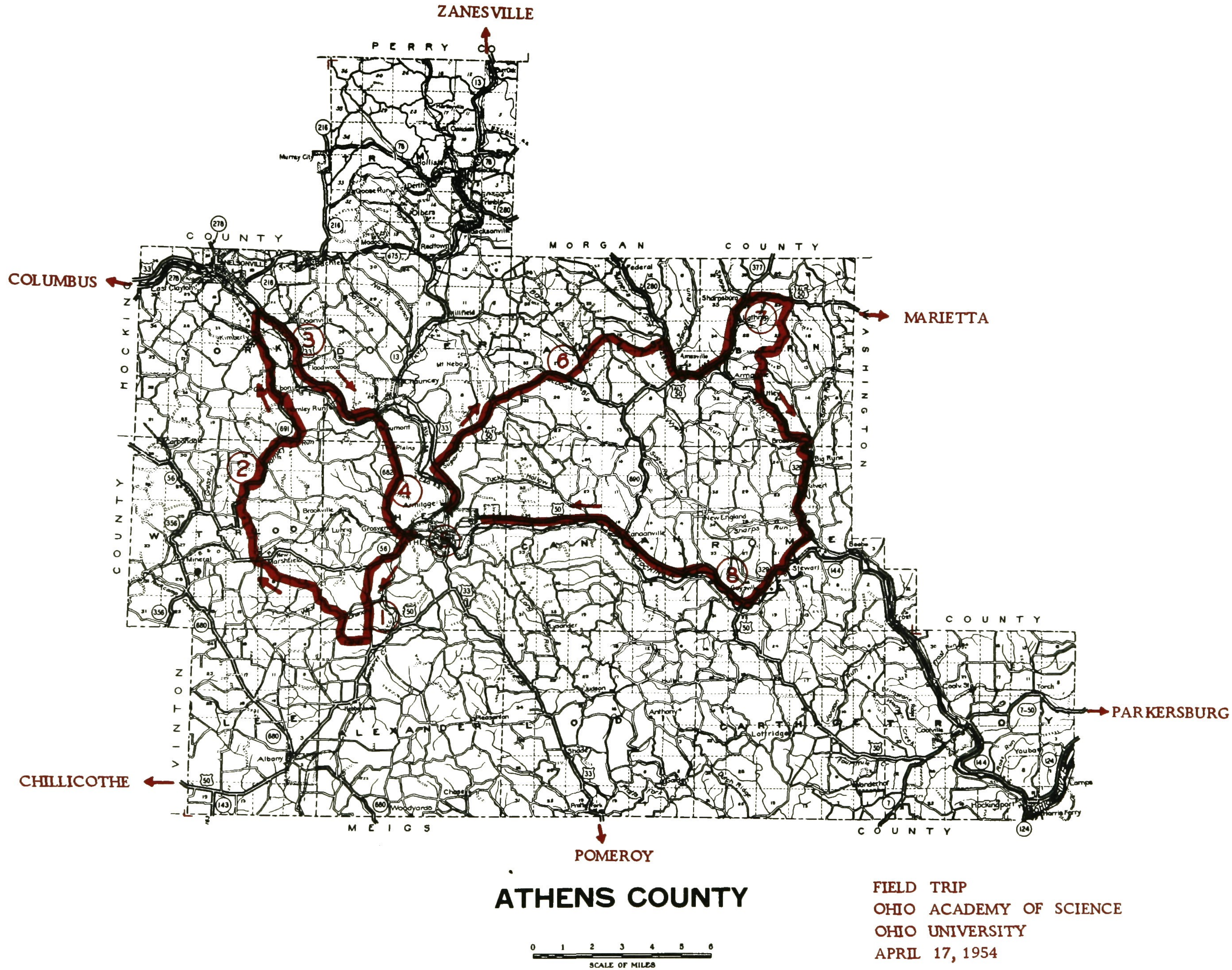


COMPOSITE INTERVALS OF MEMBERS SEEN

ON FIELD TRIP IN

ATHENS COUNTY

1" Vertical = 50'



ATHENS COUNTY

FIELD TRIP
OHIO ACADEMY OF SCIENCE
OHIO UNIVERSITY
APRIL 17, 1954

INTRODUCTION

All the bedrock of Athens County is sedimentary in origin. Strata of the Allegheny, Conemaugh, and Monongahela Series in the Pennsylvanian System and of the Dunkard Series in the Permian System outcrop within the area. Shale, sandstone, marine and freshwater limestones, underclay, coal, and "iron ore" are the common rock types. Recent and Pleistocene alluvial and glaciofluvial deposits are present along the larger valleys. Rock structure is relatively simple with the regional strike a little east of north and a southeastern dip of about 30 feet to the mile. Hence the oldest rocks outcrop along the northwest edge of the County and the youngest ones along the Ohio River at the southeast corner.

The topography is mature with the upland Lexington surface averaging 900 to 1000 feet above sea level. The principal streams are the Ohio River and its tributary, the Hocking River, which flows diagonally southeast across and drains most of the County. The larger Hocking Tributaries are Federal, Margaret, Sunday, and Monday Creeks.

This field guide, based upon field work done under the auspices of the Ohio Division Geological Survey, is designed to introduce the rocks and other geologic features of the western and central parts of the County. The strata shown will include most of the members from the Middle Kittanning No. 6 Coal in the Allegheny Series up to the Waynesburg Sandstone near the base of the Dunkard Series. (See Generalized section) This running log gives the mileage and indicates features of physiography, stratigraphy, and economic geology along the route. Several stops will be made to permit first hand inspection of most of the stratigraphic members seen. There are also several sections given where lack of time does not permit a stop but a major outcrop may be noticed in passing.

The area covered by the trip is confined to the Athens and Chesterhill Quadrangles of the USGS Topographic Series.

ROAD LOG FOR OHIO ACADEMY OF SCIENCE FIELD TRIP

ATHENS COUNTY, OHIO

April 17, 1954

Miles

0.0 Begin checking milage on bridge over the Hocking River on Route 56.

0.1+ Wisconsin terraces and Margarets Creek along right.

0.4 Fine Brush Creek Ls. exposure on left. Good fossil collecting but some danger of falling rocks.

Exposure along left (east) side of Route 56 about 0.4 mile southwest of Hocking River at White's Mill. This is known as the White's Mill section.

No.	Unit and Description		Thickness Ft.	Thickness In.	Total Ft.	Total In.
13.	Sandstone, light gray with limonite stain, fine, micaceous, shaly appearing, especially in lower part, more massive above, exposed. BUFFALO		25±	0	46	0
12.	Shale, medium gray becoming lighter above, with numerous, small, flattened concretions more or less arranged in layers, sparingly fossiliferous in lower part, thickness variable.		6	8	21	11
11.	Shale, medium gray, fossiliferous, with few small concretions in upper part, marine	LOWER BRUSH CREEK	1	6	15	3
10.	Limestone, medium to dark gray, impure, shaly, pyritiferous, fossiliferous, marine, thickness variable	LOWER BRUSH CREEK	0	6	13	9
9.	Shale, dark gray, carbonaceous, fissile, pyritiferous, with fossiliferous nodules of limestone and pyrite	LOWER BRUSH CREEK	0	3	13	3

			Ft.	In.	Ft.	In.
8.	Coal, shaly, pyritiferous.	LOWER	0	2	13	0
7.	Coal, bright with dull shaly partings, fusain, and pyrite . .	BRUSH CREEK	0	3	12	10
6.	Clay, dark gray, carbonaceous, plastic		0	1	12	7
5.	Clay, light gray with limonite stain and small concretions or nodules in lower part		0	6	12	6
4.	Clay-shale, medium to light gray with limonite stain, somewhat silty, breaks with irregular fracture, slickensided		2	0	12	0
3.	Shale, medium to dark gray with limonite stain, silty and argillaceous, non-bedded		2	0	10	0
2.	Clay-shale, gray, mottled, somewhat silty, with distinct starch-like fracture		3	0	8	0
1.	Shale, gray with iron stains, argillaceous and silty, grades upward into overlying clay-shale, exposed		5	0	5	0

0.9 Cross N.Y.C. Railroad.

1.2 Cross Margaret Creek.

1.8 Turn left uphill on Baker Road.

2.1 This High level somewhat dissected (on right) is the old Chauncey Valley which is a Teays Stage and about 0.7 mile wide. The Athens Country Club Golf Course is located on this old valley floor.

2.8 Descend to valley of West Branch Margaret Creek.

3.1 Turn left from Baker Road and proceed across West Branch.

3.5 STOP #1

Exposure along left side (east) of road south of West Branch of Margaret Creek and southeast of 649 road intersection, Athens Twp., Athens Co., Ohio. Section continues uphill to first house on left.

No.	Unit and Description	Thickness		Total	
		Ft.	In.	Ft.	In.
26.	Shale, gray to olive grading to pale maroon above, clayey, very finely micaceous, exposed	4	5	60	0
25.	Coal smut.	0	1	55	7
24.	Clay, light gray, silty, plastic	0	1	55	6
23.	Shale, gray, argillaceous, calcareous, with scattered small limestone nodules, fossiliferous, marine. PORTERSVILLE	1	11	55	5

			Ft.	In.	Ft.	In.
22.	Coal. ANDERSON		0	2	53	6
21.	Clay, light gray to gray, plastic, with numerous slickensides		3	0	53	4
20.	Clay, light gray to light greenish gray or purplish, plastic, with numerous, small, freshwater limestone nodules below, BLOOMFIELD		6	0	50	4
19.	Shale and sandstone, limonite stained, silty, micaceous, fine grained; sandstone calcareous		3	1	44	4
18.	Limestone, light greenish gray weathering yellowish brown, nodular, sparingly fossiliferous, marine. CAMBRIDGE . . .		0	6	41	3
17.	Shale, light gray to olive drab with limonite stain, silty, micaceous		6	7	40	9
16.	Sandstone, light gray weathering brownish to yellowish, micaceous, bedded		1	8	34	2
15.	Shale, and siltstone, light gray to olive drab with limonite stain, silty, sandy, micaceous with layers and scattered nodules of ferruginous limestone and limonite masses, fossiliferous, marine	UPPER BRUSH CREEK	4	10	32	6
14.	Limestone, much limonite stained, dense, silty, fossiliferous, marine		0	7	27	8
13.	Shale, light gray to olive drab with limonite stain, silty, micaceous, with few limonite masses		11	10	27	1
12.	Shale, olive drab limonite stained, thin nodular limonite layer near base, fossiliferous, marine		1	3	15	3
11.	Limestone, gray weathering lighter or with limonite stain, dense, somewhat flinty near top, weathers to soft pasty clay, fossiliferous, marine . . .	LOWER BRUSH CREEK	0	5	14	0
10.	Limestone, light to greenish gray with limonite stain, fossiliferous marine		1	3	13	7
9.	Limestone, dark gray with some limonite stain, dense, fossiliferous, marine, thickness variable		1	5	12	4

			Ft.	In.	Ft.	In.
8.	Sandstone, light gray with much limonite stain, fine, very micaceous, with thin clayey zones and nodules of limestone.		1	11	10	11
7.	Clay-shale, light gray to olive drab with limonite stain, very micaceous, few fossils, marine	LOWER BRUSH CREEK	1	3	9	0
6.	Shale, light gray with limonite stain, very sandy and micaceous, calcareous with small limestone nodules . . .		0	9	7	9
5.	Limestone, light gray weathering yellowish brown, sandy, micaceous, nodular, fossiliferous, marine		0	4	7	0
4.	Shale, light gray with limonite stain, silty with clayey zones and sandy top, micaceous . . .		3	5	6	8
3.	Clay, light gray with considerable limonite stain, sandy, micaceous, somewhat plastic .		0	6	3	3
2.	Coal.		0	2	2	9
1.	Shale, light gray to olive drab with some limonite, silty, micaceous, clayey at top, exposed		2	7	2	7

3.7 Again climb to floor of Old Chauncey Valley.

4.1 Anderson Coal and Portersville Shale along road on left side.

4.4 Turn RIGHT on gravel road and proceed 1.1 mile.

5.5 Turn RIGHT.

6.2 Turn LEFT on Baker Road and watch for next turn.

6.4 TURN RIGHT uphill just before coming to big white house.

6.8 Drop down into Valley of West Branch.

7.7 Teays Stage Valley.

7.85 TURN LEFT.

7.95 Orange and white striped poles mark path of 30" gas line. There are 2 of these through the area. The limestone is Brush Creek and we continue up through some poorly exposed shales to the Ames Ls.

8.3 Ames Limestone.

8.7 Morgantown Ss. above Ames.

9.0 Travel along Upland Summit Level, Lexington.

10.0 Junction Route 56 on East Edge of New Marshfield. STOP - Turn left on Route 56.

10.2 Cross mainline B. & O. Railroad. Buffalo Ss. in cut to left. Watch for next turn!

10.25 Turn RIGHT uphill about 50 yards across tracks onto narrow gravel road.

11.6 Loose blocks of Ames Ls.

11.8 Continue LEFT, AHEAD at road junction.

11.85 Ames Ls. with bedded sandstone on right and as you go uphill.

12.1 Travel along Summit level, Lexington.

12.6 Junction Ohio Route 691, STOP. Turn right and continue ahead through crossroads. Near Summit, note Ames Ls. on both sides of road.

13.0 Continuing downhill noting dark shaly facies of Brush Creek Ls. on right.

13.1 Descend into Hamley Run basin. Note Lower Mahoning Ss. at creek level along right here and all along Run as we proceed.

14.15 Continue LEFT on Route 691.

14.2 STOP #2.

Exposure along left (west) side of Route 691, SW $\frac{1}{4}$, SW $\frac{1}{4}$, section 12, Waterloo Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness Ft.	Thickness In.	Total Ft.	Total In.
4.	Sandstone, light gray limonite stained, medium to coarse, massive, base disconformable, exposed. LOWER MAHONING .	15	0	18	5
3.	Clay-shale, gray with limonite stain, somewhat plastic, variable thickness	0	2	3	5
2.	Coal, bright and dull, bony at top and bottom, fusain and pyrite, melanterite and sulphur on weathered surfaces, thickness variable, UPPER FREEPORT # 7	0	10	3	3

		Ft.	In.	Ft.	In.
1.	Clay, light gray with limonite stain and ferruginous masses, plastic	2	5	2	5

14.45 Concrete bridge, turn RIGHT after crossing.

14.9 Proceed through small oil field. The wells are approximately 1,000 feet deep in the Second Berea. They have been producing small amounts of oil since 1930.

16.0 Turn LEFT, abandoned #7 mines on right, Poston Station on right.

16.2 Concrete bridge, turn RIGHT after crossing, approach Poston Station.

NO PICTURES ARE TO BE TAKEN IN THIS AREA.
PLEASE COOPERATE.

POSTON STATION

Columbus and Southern Ohio Electric Company Property.
Capacity: 4 units with rated value of 200,000 KW.
Fuel: All units in operation consume on the average of 2000 Tons daily. The coal is pulverized before burning and the ash removed as dust from the smoke. Water for the boilers is pumped from wells along the Hocking River. This is an unusual situation in that most power plants are located at the source of the water.

16.7 Turn LEFT uphill just after passing under overhead belt. Proceed along belt line.

PLEASE DRIVE CAREFULLY ALONG THE BELT AND AROUND THE TIPPLE. THIS IS A PRIVATE ROAD.

BELT LINE

Manufactured and constructed by The Jeffrey Mfg. Co. of Columbus, the belt is approximately 7000 feet long. The rayon and cotton belts are 24 inches wide and move at the rate of 575 feet per minute. This combination moves the coal at about 300 tons per hour. The coal is raised a total of 155 feet as it passes over the hill from the crusher.

The coal is crushed and automatically weighed as it is loaded on the belt and is again weighed and automatically sampled as it arrives at the plant. Upon reaching the plant yards the coal is transferred to a track hopper that puts it directly into the plant or into the storage pile as desired.

17.95 Strip mine in Upper Freeport #7 coal.

18.05 Crusher and loading dock for Belt line.

18.2 End of Private Road turn LEFT for 50 yards to Route 691. STOP - Turn RIGHT on Route 691.

18.3 Proceed through area of much stripping of No. 7, Upper Freeport coal. There is little if any restoration in the area.

18.9 Upper Freeport Ls. in ditch on right as you proceed downhill. Abandoned mines along road for some distance ahead.

20.3 Upper Freeport Ls. with ss. and sh. below. Stripping in No. 7 coal.

20.8 Concrete bridge, turn RIGHT after crossing and proceed through Kimberly. This is also an area where considerable underground and strip mining of the Middle Kittanning #6 and Lower Freeport #6A coals has been carried on. All underground mines have long been closed.

21.2 Cross C. & O. Railroad on Wisconsin terrace.

21.7 Hocking River.

21.8 Junction U.S. 33. STOP. Turn RIGHT on U.S. 33. Note No. 6A stripping on left.

22.0 Middle Kittanning Ss. on left along road for about ½ mile.

22.8 Cross C. & O. Railroad No. 6 coal at level of tile house on left. Cemetery on left.

23.3 STOP #3

Exposure on left side (north) of Route 33 along hill of circumallu-viation ½ mile south of Doanville, York Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness Ft.	Thickness In.	Total Ft.	Total In.
13.	Shale, gray, sandy, with thin irregular layers of sandstone, exposed	10	0	66	4
12.	Sandstone, gray with limonite stain, medium to coarse, heavy bedded to massive, base disconformable. LOWER FREEPORT . .	43	0	56	4
11.	Shale, gray, silty and sandy, with few fossil plants	1	4	13	4

			Ft.	In.	Ft.	In.
10.	Coal, shaly, with fusain and shale partings	MIDDLE KITTANNING No. 6	2	2	12	0
9.	Shale, gray to dark gray, carbonaceous, with coaly partings		0	6	9	10
8.	Coal, bright with thin fusain partings		2	6	9	4
7.	Shale, gray to dark gray, argillaceous		0	2	6	10
6.	Coal, mostly bright		1	11	6	8
5.	Shale, gray to dark gray, argillaceous, with thin coaly partings		0	2	4	9
4.	Coal, bright with thin dull partings		1	2	4	7
3.	Clay, light gray, plastic		0	7	3	5
2.	Shale, gray, silty		0	8	2	10
1.	Sandstone, gray, medium, micaceous, thin bedded, with fossil plant rootlets, exposed .		2	2	2	2

23.7 Cross Monday Creek.

23.8 Lower Freeport Ss. on LEFT.

24.3 Floodwood.

24.7 Stripping of Upper Freeport #7 uphill to LEFT.

25.5 Abandoned deep mines of No. 7 coal on left.

26.05 Water wells for Poston Station across Hocking River to right.

26.7 Circle Hill.

27.0 Remnant of Illinoian terrace above on Left. (Two white houses on terrace)

27.7 Junction 682. Turn RIGHT on 682.

27.9 Cross Hocking River and C. & O. Railroad.

28.1 Beaumont formerly called Salina from old salt wells in Big Injun Ss. Wells now abandoned.

28.4 Numerous springs marking zone of water table under the plains.

28.6 Indian Mound on right. Enter The Plains. This level is abandoned Hocking River Valley with Illinoian outwash surface. Continue ahead through Village.

29.9 Leave Plains Level.

30.3 Slaters Gravel Pit. Turn LEFT.

STOP #4

Slater's Gravel Pit near southeast end of The Plains, Athens Twp., Athens Co., Ohio. The following section is only a generalized one, as the face of the pit varies considerably from time to time. Hocking soil profile is developed on Illinoian terraces and floodplain with deep leaching and iron staining.

No.	Unit and Description	Thickness Ft.	Thickness In.	Total Ft.	Total In.
5.	Weathered zone of yellow, buff, or brown, clayey, sand and gravel, leached and stained with cemented zones.	8+	0	20+	0
4.	Gravel, moderate yellowish brown, pebbles well rounded to 1 inch or more in size, mostly igneous, metamorphic, chert, or sandstone in composition; matrix medium to coarse sand, some lenses of sand	2	0	12	0
3.	Gravel, moderate yellowish brown, pebbles well rounded, similar to those above but fewer and smaller, matrix medium to coarse, some lenses of sand.	5	6	10	0
2.	Gravel, moderate grayish brown, pebbles well rounded, mostly under $\frac{1}{2}$ inch in size but some to 3 inches in diameter, lenses of medium sand near top, minor silt and clay .	4	0	8	6
1.	Sand, moderate yellowish brown, coarse to medium, finer downward, few scattered pebbles, bedded and cross-bedded, exposed .	4	6	4	6

(Zone 1 is mostly below the present pit floor. Recently near the washer there has been uncovered still lower about 5 feet of laminated clay and silt. Locally in the pit zones of gravel are cemented by calcite into conglomerate.)

30.8 Rejoin Route 682. STOP. Turn LEFT on 682.

31.3 Chauncey Creek Valley and Teays Stage.

31.6 Descend to Valley of Little Factory Creek.

32.3 Mahoning Ss. on right.

32.6 Continue LEFT on 682. Note Wisconsin Terrace Level on Right.

33.0 Grosvenor Tower. Crossing of N.Y.C. and B. & O. Railroads.

33.15 Margaret Creek.

33.3 Junction Route 56. STOP. Turn LEFT across Hocking River into Athens.

34.5 Cross B. & O. Railroad, continue straight ahead thru two lights and turn right just past Auditorium onto University Terrace.

35.1 Continue 1 block and cut SHARP RIGHT onto Campus and Park behind Ellis Hall.

STOP #5. LUNCH. Lunch will be available in Room 7 in southeast corner of Ellis Hall basement. Washrooms for both men and women are located in basement.

35.2 Drive across Campus to Court Street. STOP. Turn RIGHT and continue thru 4 lights to dead end at 5th light.

35.8 Turn LEFT at 5th light onto U.S. 33 & 50A and continue straight uphill thru 2 lights. The group will pause along wide road at top of hill to allow all cars to clear lights and form convoy.

36.5 Pass Thru cut in Morgantown Ss.

Exposure along right (northeast) side of Route 33 from edge of Athens to near base of hill, Athens Twp., Athens Co., Ohio.

No.	Unit and Description		Thickness Ft.	Thickness In.	Total Ft.	Total In.
22.	Sandstone, light gray to olive with limonite stain, fine grained, silty, micaceous, thin and irregular bedded, shaly upward	MORGAN-TOWN	15	2	133	0
21.	Sandstone, light gray with limonite stain, fine to medium, coarser at top, micaceous, mostly massive but shows some bedding and cross bedding on surfaces, grades laterally into shale, pyrite layers near base	MORGAN-TOWN	23	0	117	10

No.	Description	Ft.	In.	Ft.	In.
20.	Coal horizon, locally present. ELK LICK . .				
19.	Clay-shale, mostly greenish gray mottled with yellow and buff, somewhat plastic and with numerous, small, ferruginous, limestone nodules near top.	5	4	94	9
18.	Shale, light greenish gray with some limonite stain, argillaceous, grades upward into overlying clay-shale	4	2	89	5
17.	Shale, various shades of gray, argillaceous with small ferruginous masses toward top, fossiliferous and marine in lower part . . . . . . GAYSPORT	3	6	85	3
16.	Limestone, pale yellowish brown to olive drab, dense, impure with irregular calcite veins, nodular, fossiliferous, marine embedded in olive drab, silty shale . . . . GAYSPORT	1	4	81	9
15.	Shale, light gray to olive drab, with limonite stain, silty, argillaceous, micaceous. . .	4	1	80	5
14.	Limestone, light gray with limonite stain near surfaces, dense to partly crystalline a massive layer, fossiliferous, marine. AMES.	1	6	76	4
13.	Clay-shale, dark gray with some limonite stain, finely micaceous, with thin carbonaceous streaks.	1	6	74	10
12.	Sandstone and shale, light olive drab, silty, finely micaceous shale, grading upward into silty, fine, micaceous sandstone . . .	8	3	73	4
11.	Shale, varicolored dark gray to black, greenish gray, or red, argillaceous and/or carbonaceous, very finely micaceous. HARLEM	1	0	65	1
10.	Clay, light greenish to gray above, somewhat silty, finely micaceous, with small limestone nodules in base, moderately plastic	3	2	64	1
9.	Clay-shale, varicolored, reddish brown, yellowish gray and greenish gray, with small limestone nodules. ROUND KNOB .	16	4	60	11
8.	Shale and sandstone, variable in color and lithology, small, impure limestone nodules (Ewing ?) at 27' above base of section	27	0	44	7
7.	Shale, dull reddish brown with light greenish gray masses, argillaceous, finely micaceous, grades upward into overlying shale.	5	0	17	7

			Ft.	In.	Ft.	In.
6.	Shale, light greenish gray with slight limonite stain, finely micaceous, fossiliferous, marine, with nodules of marine limestone	PORTERSVILLE	0	8	12	7
5.	Shale, gray, argillaceous and calcareous, finely micaceous, fossiliferous, marine . .		3	4	11	11
4.	Coal, shaly with bright streaks.	ANDERSON . .	0	½	8	7
3.	Clay-shale and clay, light gray shale at base grading upward into gray, limonite stained, calcareous clay with small, scattered limestone nodules, weathers somewhat plastic . .		7	7	8	6½
2.	Sandstone, light gray to almost white, fine, silty, micaceous, slightly calcareous		0	5½	0	11½
1.	Shale, light olive gray with some limonite stain, sandy, silty, micaceous, exposed		0	6	0	6

38.4 Valley Drive-in Theater on left. **WATCH FOR TURN AHEAD.**

38.5 Cross Sugar Creek.

38.6 TURN RIGHT. Continue on U.S. 50A.

38.9 Old Mine #210 Dump on right. Abandoned shaft of Middle Kittanning #6 coal about 150' deep.

39.6 Upper Brush Creek Ls. on left of curve. Sandstone on left ahead is Cow Run.

Small exposure on inside of curve along left (west) side of Route 50A 1.0 mile north of junction with Route 33, Athens Twp., Athens Co., Ohio.

No.	Unit and Description		Thickness Ft.	Thickness In.	Total Ft.	Total In.
8.	Shale, olive drab with some limonite stain, silty, micaceous, exposed.		8	0	18	11
7.	Limestone, gray to light gray with some limonite stain, shaly to very shaly, fossiliferous, marine	UPPER BRUSH CREEK	0	8	10	11
6.	Limestone, light gray with limonite stained surfaces, dense, compact, partly crystalline, fossiliferous, marine, thickness variable.		1	2	10	3

		Ft.	In.	Ft.	In.
5.	Sandstone, light gray with much limonite stain, fine to medium, micaceous, calcareous, no apparent fossils	0	6	9	1
4.	Shale, very similar to that below underlying sandstone.	0	7	8	7
3.	Sandstone, light gray to brown and yellow, fine to medium, micaceous, bedded in layers ½ to several inches thick	1	0	8	0
2.	Shale, light gray with considerable limonite stain, silty, very sandy, micaceous, with thin, fine micaceous sandstone layers . .	4	0	7	0
1.	Shale, light bluish gray with considerable limonite stain, argillaceous to silty, micaceous, exposed.	3	0	3	0

41.1 Old Mine #211 Dump on right.

41.7 Cambridge Ls. on right.

Exposure along east side of Route 50A just south of road junction, NE ¼, SW ¼, section 2, Dover Twp., Athens Co., Ohio.

No.	Unit and Description		Thickness Ft.	Thickness In.	Total Ft.	Total In.
6.	Shale and limestone, light olive drab to tan with limonite stain, argillaceous, silty, micaceous, sparingly fossiliferous shale with nodules of ferruginous fossiliferous marine limestone, exposed	CAMBRIDGE	2	0	12	8
5.	Limestone, light bluish to greenish weathering brown and yellow, ferruginous, partly dense and partly crystalline, very fossiliferous . . .	CAMBRIDGE	0	3	10	8
4.	Shale, light tan to olive drab with limonite stain, argillaceous, silty, finely micaceous, no apparent fossils	CAMBRIDGE	0	11	10	5
3.	Limestone, light bluish gray, weathering brown and yellow, ferruginous, sandy, micaceous, dense, fossiliferous, marine. .	CAMBRIDGE	0	7	9	6

		Ft.	In.	Ft.	In.
2.	Shale, light gray weathered olive drab with some limonite stain, silty, sandy, micaceous	2	5	8	11
1.	Sandstone, light gray with considerable limonite stain, fine, silty, micaceous, in layers $\frac{1}{4}$ to several inches thick, thin layers of light bluish gray shale, exposed	6	6	6	6

42.1 Ames Ls. and Morgantown Ss. may be seen in fields to left.

42.75 Uphill through Ames to Pittsburgh interval. Freshwater limestone is below Connelsville Ss.

42.9 Pittsburgh Ss. is in field above road level on top of hill. Coal is only 1" thick.

43.6 Ames Ls. in creek on right.

44.7 TURN LEFT uphill on gravel road by farm house. Prominent exposure of Ames Ls. and Morgantown Ss. on this hill. Continue over hill noting repeat of section on other side.

45.4 STOP # 6.

Exposure uphill along road on right (east) side to road junction 770 in SE $\frac{1}{4}$, NW $\frac{1}{4}$, section 21, Ames Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness		Total	
		Ft.	In.	Ft.	In.
19.	Limestone, gray to greenish gray weathering yellow to dark brown, nodular and irregularly bedded, much weathered, fossiliferous, marine. SKELLEY	0	4	75	8
18.	Shale and sandstone, light gray to tan and olive drab with limonite stain, thin bedded, micaceous sandstones in argillaceous to silty shale	5	4	75	4
17.	Clay-shale, gray to greenish gray, mottled red to purple and maroon, silty, micaceous .	8	4	70	0
16.	Sandstone, gray to buff, limonite stained on surfaces, fine, micaceous, medium to massive bedded, some cross bedding	9	5	61	8
15.	Shale, gray to tan with limonite stain, argillaceous becoming coarser upward, micaceous .	3	11	52	3
14.	Shale, gray to olive drab mottled maroon to purplish and with some limonite stains, argillaceous, with marine fossils in base . .	5	11	48	4

		Ft.	In.	Ft.	In.
13.	Limestone, gray to blue gray, weathering yellow to brown, nodular, fossiliferous, marine. GAYSPORT	0	4	42	5
12.	Shale, gray to olive drab with limonite stain and maroon and purple mottling, argillaceous, silty, micaceous	9	8	42	1
11.	Limestone, light gray to gray with some surface stain, dense to partly crystalline, massive ledge, fossiliferous, marine. AMES.	1	6	32	5
10.	Shale, gray to dark gray, carbonaceous, grades upward to argillaceous light gray clay-shale, silty, micaceous	1	9	30	11
9.	Coal, mostly dull with some bright, shaly, limonite stain on bedding planes, free sulphur and selenite on surfaces	0	11	29	2
8.	Clay-shale and clay, light gray to gray with some limonite stain, silty, micaceous, somewhat plastic	0	11	28	3
7.	Shale and sandstone, light gray to buff with limonite stain, micaceous, sandstone ledges up to 1 foot in micaceous, sandy, thin bedded shale.	7	9	27	4
6.	Shale, gray to dark gray with some limonite stain, argillaceous, slightly silty, micaceous	3	0	19	7
5.	Coal, mostly dull with some bright, soft, with fusain, poorly developed. HARLEM	0	4	16	7
4.	Clay, dark gray to gray with limonite stain, silty, micaceous, somewhat plastic	0	3	16	3
3.	Clay-shale, gray-green to olive drab with some limonite stain, micaceous, silty, thin bedded, with slickensided surfaces	10	6	16	0
2.	Sandstone, gray to olive drab, limonite stain on surfaces, calcareous, micaceous, weathers to nodular appearance	3	10	5	6
1.	Shale, gray to buff with limonite stain, micaceous, argillaceous, silty, exposed.	1	8	1	8

45.7 Continue ahead to white house, turn **RIGHT** just past house. Note Pittsburgh red beds and limestone on hill to left above road.

46.4 Note limestone and red beds of Pittsburgh horizon along road.

46.85 Uphill to Road Junction **TURN RIGHT** and watch for **LEFT** turn in short distance.

47.0 Continue along Summit level. Note deep youthful valley on left. This level is between the Pomeroy and Meigs Creek horizon with the Fishpot limestone showing in several places along the road.

48.0 Decend to Federal Creek Valley noting same units in the section.

48.3 Varicolored mudstones just below Meigs Creek coal horizon.

48.7 Fishpot Ls.

48.9 Pittsburgh Ls. and red beds. Quite prominent due to bright colors.

49.1 Ames Ls. at spring level on left.

49.3 TURN RIGHT and continue across NYC Railroad to Ohio Route 280.

49.4 STOP. TURN RIGHT on 280 and continue to Amesville.

50.7 Junction US 50A in Amesville. STOP. Turn LEFT on 50A, and continue to Sharpsburgh noting numerous abandoned Pittsburgh coal mines and outcrops of Pittsburgh Ls. along both sides of road.

54.1 Lathrop.

54.9 Sharpsburg. Turn RIGHT uphill.

55.0 STOP #7

Exposure east from 653 road junction up Sharpsburg Hill in NE $\frac{1}{4}$, section 29, Bern Twp., Athens Co., Ohio.

Unit and Description	Thickness Ft.	In.	Total Ft.	In.
Sandstone, coarse below to medium above, massive, exposed to hilltop along US 50A	7	1	263	11
Shale, medium gray, argillaceous, thin bedded	1	$11\frac{1}{2}$	261	$11\frac{1}{2}$
Coal, shaly, or shale, coaly, WAYNESBURG . . . 971'	0	$0\frac{1}{2}$	261	11
Shale, grayish red to olive gray, strong or prominent sandy rubble zone near base, weathers to dust near top, iron stains prominent in upper 3"	15	7	246	4
Shale, moderate olive brown to olive gray, silty above	13	10	232	6
Shale, purplish gray, platy, some mottled dusky red.	2	2	230	4
Shale, gray, clayey below	0	$2\frac{3}{4}$	230	$1\frac{1}{4}$
Carbonaceous and coaly shale, LITTLE WAYNESBURG . . . 939'	0	$0\frac{1}{4}$	230	1
Shale, dusky red, non-bedded, zones of limestone knots and lumps	10	9	219	4
Shale, grayish red, platy	8	7	210	9

	Ft.	In.	Ft.	In.
Shale, olive gray, thin bedded	0	6	210	3
Sandstone, moderate olive brown, thin bedded, micaceous	2	6	207	9
Shale, gray, weathering grayish red, platy, medium bedded, weathers chippy	2	10	204	11
Clay shale, gray, soft, weathers yellow	0	$0\frac{1}{2}$	204	$10\frac{1}{2}$
Carbonaceous shale, smut streak, UNIONTOWN. 914'	0	$0\frac{1}{2}$	204	10
Shale, calcareous, conspicuous weak zone, gray below, interbedded, dusky red and olive gray above, numerous hard limestone knots and masses throughout, weathers to pale olive gray dust	19	10	185	0
Sandstone, in several ledges, gray to olive brown, thin irregular laminations, medium to fine, some shale partings	8	2	176	10
Shale, grayish red to olive gray interbedded, silty to more sandy upward	5	6	171	4
Clay shale, gray, considerable iron stain, thin bedded	0	$10\frac{3}{4}$	170	$5\frac{1}{4}$
Coaly shale	0	$0\frac{1}{4}$	170	5
Clay shale, olive gray, considerable limonite stain	0	4	170	1
Shale, dusky red below, variegated olive green to dusky red above, abundant limestone knots and flakes on top, weathers to dust	5	4	164	9
Covered	4	5	160	4
Shale, dusky red, weathers to dust, prominent red zone	3	6	156	10
Shale, olive gray to dark gray	0	3	156	7
Limestone, olive gray to pale yellow gray, hard, massive ledge, ostracodes, conglomeratic	0	8	155	11
Shale, olive gray to dusky red, variegated, some olive green, prominent green zone	1	9	154	2
Zone weathering predominantly white				
Limestone, medium gray to pale yellowish gray, several irregular thin beds, coarsely conglomeratic, <u>ostracodes</u>, some <u>gastropods</u>, with shale partings	2	6	151	8
Shale, olive gray to dark gray	0	8	151	0
Limestone, somewhat shaly	0	8	150	4
Shale, medium gray, very dark	0	6	149	10
Shale, olive gray	0	10	149	0
Limestone, gray, coarsely conglomeratic, abundant <u>gastropods</u>, <u>spirorbis</u>, several irregular beds	2	0	147	0
Shale, olive gray to greenish, highly calcareous	0	4	146	8
Limestone, grayish olive, impure, conchoidal fracture, weathers yellow-orange	0	8	146	0
Shale, calcareous, with abundant knots, olive gray to dusky red, weathers white	2	6	143	6

		Ft.	In.	Ft.	In.
	Limestone, pale yellowish olive, massive, hard, ledge, finely conglomeratic, numerous ostracodes and gastropods	0	11	142	7
	Shale, calcareous, medium gray to purplish red and grayish olive, soft, abundant lime knots and flakes, weak zone	2	6	140	1
	Limestone, pale yellowish olive, hard ledge weathering yellowish, angular fracture.	1	0	139	1
	Shale, medium gray to olive and dusky red, with grayish red purple zone at top	3	0	136	1
	Limestone, light gray weathering yellow, slightly conglomeratic, medium coarse, recemented pebbles, prominent ledge	0	6	135	7
	Shale, variegated, olive gray to dusky red, with limestone knots, flakes and boulders, layers of limestone to 1" irregular, weathers yellowish brown	9	6	126	1
	Limestone, pale yellow to yellowish orange, fretted, very irregular, spalls in weak angular slabs in places	3	3	122	10
	Shale, olive gray to dusky red, interbedded and variegated, especially above, blocky, non-bedded, weathers to dust, especially dark purple zone 1' from top	7	4	115	6
	Sandstone, moderate olive brown, micaceous (white), somewhat lenticular, massive, with some shale sandstone zones above and below, conspicuous ledge	5	2	110	4
	Shale, olive gray, platy	1	5	108	11
	Clay shale, gray, considerable limonite stain. . . .	0	$3\frac{3}{4}$	108	$7\frac{1}{4}$
	Carbonaceous shale, varies	0	$0\frac{1}{4}$	108	7
	Clay shale, somewhat carbonaceous	0	1	108	6
	Shale, olive gray below, medium gray above, blocky to structure-less	1	2	107	4
Red-Brown weathering sandy zone	Shale, pale yellowish olive with limestone knots increasingly upward, non-bedded, weathers red brown to olive gray, transitional with unit below, prominent limonite crust at top	2	9	104	7
	Siltstone, moderate olive brown with harder zones, weathers platy, with two shale streaks, one quite clayey at 3' and 6' from top	8	11	95	8
	Sandstone, moderate olive brown, weathers red brown on faces, fine-grained, shaly toward top, micaceous.	1	9	93	11
	Shale, silty, irregularly gradational into zone above, olive gray to pale yellow gray	1	5	92	6

		Ft.	In.	Ft.	In.
	Clay shale, olive gray to olive brown, poorly bedded.	0	10	91	8
	Shale, olive gray, with very dark purplish zone at top	0	3	91	5
	Limestone, pale yellow to dusty yellow, weathers brighter, conspicuous ledge, poor conchoidal fracture	1	9	89	8
	Shale, olive gray and limestone, pale olive gray, interbedded, shale laminated in zones; limestone in nodules or boulders in beds to 4" thick	3	7	86	1
	Limestone, pale olive gray, weathers light gray, with irregular clay fracture, hard, single ledge	1	10	84	3
	Siltstone, calcareous, medium gray, irregular	1	8	82	7
	Limestone, pale olive gray, weathers white to yellowish, several irregular bouldery beds with some shaly partings, some <u>ostracodes</u> in shale	5	10	76	9
	Shale, light gray, clayey, partially calcareous	0	8	76	1
	Shale, medium gray to olive gray above, soft, clayey	1	2	74	11
	Shale, olive gray above, dusky red below, weathers to purplish dust, considerably limy flakes and knots with a few large knots	6	7	68	4
	Limestone, bouldery, gray to pale yellowish gray in gray to olive gray shale matrix	4	9	63	7
	Sandstone, highly calcareous, or limestone, silty, olive brown to gray, almost pure limestone above, micaceous	1	8	61	11
	Shale and sandstone, interbedded, 1" to 3', gray to olive gray, fine sandstone in like shale	1	0	60	11
Conspicuous yellow layer above maroon layer	Limestone, pale yellow orange, fretted, weathers slabby in zones	3	0	57	11
	Shale, olive gray to yellowish when weathered, with fretted pale yellow orange limestone included, weathers to dust	0	10	57	1
	Limestone, light yellowish orange to pale yellow, nodular or lumpy below, spalling in sharp slabs in upper layer	3	0	54	1
	Shale, light gray, weathers yellowish, highly calcareous	1	4	52	9
	Clay shale, dark gray	0	$2\frac{3}{4}$	52	$6\frac{1}{4}$
	Clay shale, gray, weathers brown with white on surfaces	0	3	52	$3\frac{1}{4}$
	Carbonaceous shale, 1/16" to 1/4"	0	$0\frac{1}{4}$	52	3

<u>Pomeroy coal horizon</u> 761'

Shale, highly calcareous, dusky red below through olive gray, variegated to dark gray at top; more clayey at top; typical leached greenish zone, weathers to dust	3	6	48	9

	Ft.	In.	Ft.	In.
Shale, highly calcareous, zones of limestone knots and lumps, almost limestone at top; dusky red to olive gray, variegated, limestone nodules, light olive gray weathering white	11	5	37	4
Limestone, light olive gray to pale olive gray, weathers light gray, irregular layers below, bouldery and lumpy upward; considerable calcareous shale matrix; weathers in hard and soft zone below to marly, nodular above, silty in zones, may be calcareous portion of sandstone, Spiroorbis and a few ostracodes shown	5	1	32	3
Shale, olive green, weathers olive brown to various shades of red and yellow brown, silty to sandy in zones, medium to fine, considerably distorted, with numerous rolls (?), spheroidal cementation (?), or collapse structures. Some larger nodular lumps in shaly zones, some lamination apparent in shaly zones, upper part uniform in surface and demarcated by thin calcareous layer 1" to 10" and 1' to 1'3" from top . . .	19	9	12	6
Shale, clayey in zones, gray to dusky red and olive green, principally non-bedded, crumbly, conchoidal fracture, weathered surfaces show peculiar dusky red to moderate red, with zones of yellowish orange to moderate yellow brown, principal mass olive brown to tan; considerable zones with irregular upper surfaces; may be sedimentary or burned.	11	9	0	9
Clay shale, greenish gray, bluish cast when wet, exposed.	0	9	0	0

Elevation 709'

Hand leveled to road intersection 643'.

55.8 Chesterhill (Waynesburg) Ss. on left along road.

56.9 TURN RIGHT on gravel road and follow ridge top on massive ss.

61.0 Hilltop above Federal Creek Valley. Descend to Utley.

Exposure along road north uphill from Utley to crossing of Texas Eastern Pipeline in the W $\frac{1}{2}$, NW $\frac{1}{4}$, section 20, Bern Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness Ft.	Thickness In.	Total Ft.	Total In.
20.	Sandstone, gray to buff with limonite stain, fine to medium with coarse zones, micaceous, friable, massive, exposed to top of hill	14	0	314	0
19.	Clay-shale, gray mottled maroon to purple, slightly calcareous at base, silty, non-bedded	19	4	300	0
18.	Sandstone, gray to olive drab with limonite stain, very fine, micaceous, thin and cross bedded	8	8	280	8
17.	Limestone and shale, light gray, dense, hard, brecciated, nodular limestone in gray to maroon and purple, silty, non-bedded shale	7	0	272	0
16.	Shale and sandstone, gray to maroon, silty, micaceous shale with interbedded thin irregular layers of fine micaceous sandstone, poorly exposed in part	43	0	265	0
15.	Sandstone, gray to tan with limonite stain, micaceous, fine, thin and shaly bedded below to medium bedded or massive above.	14	5	222	0
14.	Clay-shale, gray to olive drab with limonite stain, silty	0	2	207	7
13.	Clay-shale, dark gray with carbonaceous zones, coal horizon. UNIONTOWN	0	3	207	5
12.	Shale, gray to olive drab with limonite stain and some maroon mottling, bedded	3	11	207	2
11.	Clay-shale and limestone, light gray with limonite stain, nodular limestone in gray to maroon, silty, micaceous shale becoming more sandy and less limestone upward.	29	6	203	3
10.	Limestone, gray weathering yellow to tan or dark red, nodular in clay-shale	5	5	173	9
9.	Sandstone, gray to buff and tan, fine, micaceous, irregularly bedded below becoming coarser and more massive upwards, some calcareous lenses	53	1	168	4
8.	Clay-shale, maroon above and gray to tan below, platy, silty, micaceous	0	8	115	3
7.	Clay, carbonaceous, coal horizon. MEIGS CREEK		$0\frac{1}{2}$	114	7
6.	Clay, light gray	0	$0\frac{1}{2}$	114	$6\frac{1}{2}$
5.	Clay-shale, gray to greenish gray, silty, finely micaceous, breaks with starch-like fracture	0	5	114	6
4.	Limestone, light gray, hard, dense, nodular in gray to tan, non-bedded shale	2	11	114	1

		Ft.	In.	Ft.	In.
3.	Shale and sandstone, gray to tan and maroon shale with thin interbedded sandstone layers in upper part	52	6	111	2
2.	Sandstone, gray to tan with limonite stain, micaceous, fine to medium, massive becoming thinner bedded above	14	6	58	8
1.	Covered and slumped interval known to contain both benches of the Pittsburgh coal or about 8 feet of coal and partings. Coal observed but not measured when the Texas Eastern Pipeline was laid in 1952. Coal recently exposed in stripping operations	44	2	44	2

61.3 Stripping in No. 8, Pittsburgh Coal.

61.5 Junction Ohio 329. STOP. Turn LEFT on ROUGH ROAD.

61.65 Pass under Loading Tipple. Note abandoned Beehive ovens at road level on right. There are only a few remains of the 125 built here.

61.8 Continue down Federal Creek Valley noting numerous abandoned Pittsburgh coal mines. The overlying Pittsburgh Ss. is a prominent ledge along most of the road.

64.45 Broadwell, continue on Route 329.

65.2 Pittsburgh Ss. along right.

65.6 Note old covered bridge on left.

66.2 Mine in Pittsburgh Coal. This mine slopes below the stream level and is the last opening to the south.

66.4 Proceed through Kilvert. TURN LEFT, still on Route 329.

66.7 Bridge over Federal Creek.

68.2 Note Terraces in lower reaches of Federal Creek.

68.5 Abandoned quarry on left high on hill. Benwood-Arnoldsburg Ls.

69.5 Road junction. Turn RIGHT across Federal Creek. Hocking River to Left.

69.9 STEWART on Illinoian Terrace.

71.0 Note silts along bank at road to right. Gravels appear in banks along left of road.

72.1 Guysville, continue thru.

72.65 Junction US 50. STOP. Turn RIGHT on US 50.

72.85 STOP #8

Exposure along right (north) side of Route 50 at west edge of Guysville in SE $\frac{1}{4}$, SW $\frac{1}{4}$, Section 26, Rome Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness Ft.	Thickness In.	Total Ft.	Total In.
21.	Sandstone, light gray weathering to pale olive or tan, fine to medium, micaceous, with calcareous zones, massive with thin bedded zones, exposed	20	0	112	0
20.	Shale, light gray to tan with limonite stain throughout and purple mottling in basal 2 feet, silty, sandy, micaceous, calcareous with scattered limestone nodules, non-bedded except near top where it is bedded and fissile. MEIGS CREEK ?	8	9	92	0
19.	Clay-shale, maroon mottled gray and yellow, silty, micaceous, calcareous with some limestone nodules, non-bedded.	3	3	83	3
18.	Shale, light bluish gray weathering olive drab and with considerable limonite stain along joints, silty, with few small limestone nodules and few slickensides.	10	4	80	0
17.	Clay-shale, varicolored gray, yellow, maroon, with some slickensides and numerous fossil plants in basal part . . .	0	8	69	8
16.	Clay, gray to light gray with thin lensing streaks of coal and carbonaceous material. FISHPOT ?	0	1	69	0
15.	Clay-shale, light greenish gray to purple, maroon, and yellow, finely micaceous in part, sandy and calcareous with limestone nodules in basal part, non-bedded	4	10	68	11
14.	Sandstone, light gray, fine, micaceous, calcareous	1	0	64	1
13.	Shale, light greenish gray, silty, sandy, micaceous, calcareous with numerous small limestone nodules.	1	3	63	1

		Ft.	In.	Ft.	In.
12. Limestone, light gray weathering pale yellow or brown with an irregular spongy appearance, fresh stone massive and dense, basal 10" with numerous ostracodes . . .	FISHPOT	5	9	61	10
11. Limestone and clay-shale, gray to drab, flat nodules of dense limestone in greenish gray, soft clay-shale with faint purplish streaks		1	7	56	1
10. Clay-shale, varicolored, slightly micaceous with numerous slickensides, non-bedded except basal inch or two.		2	6	54	6
9. Coal, thin coaly and carbonaceous streaks in gray clay, numerous slickensides. POMEROY ?		0	2	52	0
8. Clay, gray, silty, finely micaceous, non-bedded, slightly plastic upon weathering.		0	10	51	10
7. Clay-shale, greenish gray with some purplish to maroon mottling, finely micaceous non-bedded, with impure calcareous nodules in basal part		2	0	51	0
6. Shale and sandstone, light bluish gray shale interbedded with fine sandstone, mostly shale at top, base locally with coal and clay zones, cut out laterally by sandstone below		15	6	49	0
5. Sandstone, light gray weathering pale greenish to yellowish, fine, micaceous, rather massive but showing bedding and cross bedding on weathered surfaces, thickness variable, a lens with disconformable base cutting out shale and sandstone above		15	3	53	6
4. Shale, gray with slight limonite stain, silty, micaceous, thickness variable . . .		4	2	18	3
3. Shale, dark gray, carbonaceous to bony at base, somewhat fissile, with numerous fossil ostracodes and fish remains.		0	6	14	1

No.	Unit and Description	Ft.	In.	Ft.	In.
2.	Coal, some bright and blocky with dull and shaly partings and some pyrite. PITTSBURGH	0	3	13	7
1.	Limestone, gray to light greenish gray weathered light gray or yellow, some limonite stain, dense, nodular to irregularly bedded with thin shaly partings near top and bottom	13	4	13	4

73.3 Pittsburgh Ls. coal and red shales.

Exposure along right (northeast) side of Route 50 about 0.75 mile northwest of Guysville in NE $\frac{1}{4}$, SE $\frac{1}{4}$, section 32, Rome Twp., Athens Co., Ohio.

No.	Unit and Description	Thickness		Total	
		Ft.	In.	Ft.	In.
6.	Sandstone, gray to tan with some limonite stain, fine to medium, micaceous, massive to bedded above, exposed	27	0	58	3
5.	Clay-shale, gray to dark gray and tan with limonite stain, with some fossil plants . . .	0	4½	31	3
4.	Coal, dull, soft, shaly, PITTSBURGH	0	2½	30	10½
3.	Limestone, gray to medium gray with some limonite stain, dense, bedded to heavy bedded with gray to tan argillaceous shale . .	14	3	30	8
2.	Shale, gray to tan mottled red to yellow, mostly massive with starch-like fracture, like flint clay in appearance	10	5	16	5
1.	Shale, gray to greenish gray with some maroon mottling and limonite stain, argillaceous, silty, non-bedded, exposed . .	6	0	6	0

73.8 Pittsburgh rises along road as we proceed up the dip.

74.3 Limestone Quarry in Pittsburgh Ls. on right.

75.2 Little Pittsburgh Ss. on right.

76.7 Canaanville.

77.1 Canaanville Shaft to Middle Kittanning #6 Coal to right was over 400 feet deep. Now abandoned.

79.1 Stroud Run, site of State Forest and proposed lake.

79.4 Massive Connelsville Ss. Ames limestone comes to surface along here.

82.2 Athens City Limits.

DRIVE CAREFULLY

The main routes from Athens are marked on your guide map.